

What is claimed is:

- 1        1.        A nucleic acid molecule encoding a fusion protein comprising:
  - 2            (a)        a signal sequence;
  - 3            (b)        an immunoglobulin Fc region; and
  - 4            (c)        a target protein sequence comprising interferon-alpha,  
5            wherein the signal sequence, the immunoglobulin Fc region and the target protein  
6            sequence are encoded serially in a 5' to 3' direction.
- 1        2.        The nucleic acid of claim 1 wherein the immunoglobulin Fc region  
2        comprises an immunoglobulin hinge region.
- 1        3.        The nucleic acid of claim 1 wherein the immunoglobulin Fc region  
2        comprises an immunoglobulin hinge region and an immunoglobulin heavy chain constant  
3        region domain.
- 1        4.        The nucleic acid of claim 1 wherein the immunoglobulin Fc region  
2        comprises an immunoglobulin hinge region and an immunoglobulin CH3 domain.
- 1        5.        The nucleic acid of claim 1, wherein the immunoglobulin Fc region  
2        comprises a hinge region, a CH2 domain and a CH3 domain.
- 1        6.        The nucleic acid of claim 5 wherein the immunoglobulin Fc region  
2        comprises a portion of an immunoglobulin gamma sequence. - - -
- 1        7.        The nucleic acid of claim 6 wherein the immunoglobulin gamma is human  
2        immunoglobulin gamma1.
- 1        8.        A replicable expression vector for transfecting a mammalian cell, the  
2        vector comprising the nucleic acid of claim 1.

3 (b) culturing the mammalian cell to produce the fusion protein.

1           21.    The method of claim 20 comprising the additional step of collecting the  
2    fusion protein.

1                   22.     The method of claim 20 comprising the additional step of purifying the  
2     fusion protein.

1           23. The method of claim 20 comprising the additional step of cleaving with a  
2 proteolytic enzyme the immunoglobulin Fc region from the target protein at a proteolytic  
3 cleavage site disposed between the immunoglobulin Fc region and the target protein.

1           24. A method of treating a condition alleviated by the administration of  
2 interferon-alpha comprising the step of administering the nucleic acid of claim 1 to a  
3 mammal having the condition.

1           25. A method of treating a condition alleviated by the administration of  
2 interferon-alpha comprising the step of administering the vector of claim 8 to a mammal  
3 having the condition.

1        26. A method of treating a condition alleviated by the administration of  
2 interferon-alpha comprising the step of administering the fusion protein of claim 11 to a  
3 mammal having the condition.

1           27. A method of treating a condition alleviated by the administration of  
2 interferon-alpha comprising the step of administering protein of claim 18 to a mammal  
3 having the condition.

1 28. The method of claim 26 wherein the condition is a liver disorder.

29. The method of claim 28 wherein the liver disorder is hepatitis.

1           9.     The replicable expression vector of claim 8 wherein the vector is a viral  
2     vector.

1           10.    A mammalian cell harboring the nucleic acid of claim 1.

1           11.    A fusion protein comprising in an amino terminal to carboxy terminal  
2     direction an immunoglobulin Fc region and a target protein comprising interferon-alpha.

1           12.    The fusion protein of claim 11 wherein the interferon-alpha comprises an  
2     amino acid sequence set forth in SEQ. ID. NO.: 2, 7 or 8-21 or a species or allelic variant  
3     thereof.

1           13.    The fusion protein of claim 11 wherein the target protein comprises at  
2     least two interferon-alpha molecules linked by a polypeptide linker.

1           14.    The fusion protein of claim 13 further comprising a polypeptide linker  
2     linking the immunoglobulin Fc region to the target protein.

1           15.    The fusion protein of claim 11 wherein the immunoglobulin Fc region  
2     comprises an immunoglobulin hinge region and an immunoglobulin heavy chain constant  
3     region domain.

1           16.    The fusion protein of claim 15 wherein the heavy chain constant region  
2     domain comprises a CH3 domain.

1           17.    The fusion protein of claim 11 wherein the immunoglobulin Fc region  
2     comprises a hinge region, a CH2 domain and a CH3 domain.

1           18.    A multimeric protein comprising at least two fusion proteins of claim 11  
2     linked via a covalent bond.

1           19.    The protein of claim 18 wherein the covalent bond is a disulfide bond.

1           20.    A method of producing a fusion protein comprising the steps of:  
2                   (a)     providing the mammalian cell of claim 10; and